Work Order ID 69585

Thursday, May 12, 2011 2:21:53 PM

Item ID: D212-664-201 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Aft

Start Date: 5/12/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/2/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** M **Date:** 11-05-12 **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	**Revision Nbr**								
D212-664-241	Rev D								
100		0.00							
DC	DOCUMENT CONTROL								
Document Control	**Memo** Photocopy bluefile and create labels as per PPP D212-664-201	0.00	CHG004		δ 11/06/01				
110	Pick Kit	0.00							
Packaging	Packaging								
Packaging	**Memo**	0.00							11-5-19
120		0.00							
CNC Bend 2	BENDING MACHINE - CROSSTUBES								
CNC Alpha 160 Bender	**Memo** Bend tube as per Dwg D212-664-241 using CNC bender program 212-aft	0.00							11-5-9

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 69585

Thursday, May 12, 2011 2:21:53 PM

Item ID: D212-664-201 **Accept** **Setup Start**

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Item Name: Crosstube Aft

Start Date: 5/12/2011 **Start Qty:** 1.00 **Cust Item ID:**

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Reference:

Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
QC	**Memo**	0.00							
Quality Control									
140		0.00							
Crosstubes	Crosstubes								
Crosstubes	**Memo**	0.00							

1-Drill pilot holes in tube as per Dwg D212-664-241 using drill Jig DT8550, DT8551, drill table DT8577 and locate tower holes #8 as per QSI0010.

2-Ream hole to finish size in tube as per Dwg D212-664-241using drill Jig DT8550 & DT8551.Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-241

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

Work Order ID 69585

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Revision ID:

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Required Date: 6/2/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Crosstubes Chemical Conversion	0.00				1			
HandFXtube	**Memo**	0.00							
Hand Finishing Crosstubes	Chemical Conversion Coat as within 24 hours of bending and drilling		SAD 11-05-26						
160	QC3- Inspect Part Finish	0.00							
QC	**Memo**	0.00	5 11/05/26						
Quality Control									
170	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00	5 11/05/26						
Quality Control									

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W/O:		WORK ORDER CHANGES					
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QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00							
Outsource2	**Memo**	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038 Issue P/O: 14176 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190	Receive & Inspect for Damage & Mat'l Certs Packaging	0.00							
Packaging	**Memo**	0.00							
Packaging	Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D212-664-241								

CL 11/05/26 ①

11/6/26 ①

ET 11-05-26

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

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NOTE: Date & initial all entries

Work Order ID 69585

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Item ID: D212-664-201 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Aft

Start Date: 5/12/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/2/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	Spray Painting per QSI005 4.2	0.00							
SprayPaint	SprayPaint					RT	11-05-27		
SprayPaint	**Memo**	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 PRIME: Start Time:_____ 11-05-26 Fininsh Time:_____ PAINT: Start Time:_____ 11-05-27 Finish Time:_____ part of DEO 212-664-241-A-1								
220	QC14- Inspect Spray Paint	0.00							
QC	**Memo**	0.00							
Quality Control	Then,Wrap in plastic bag to protect from scratches								

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W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

Work Order ID 69585

Thursday, May 12, 2011 2:21:53 PM

Item ID: D212-664-201 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Aft

Start Date: 5/12/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/2/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230	Crosstubes	0.00							
Crosstubes	**Memo**	0.00							

Crosstubes

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs
A/R 6398 Magnobond Batch: 116677
Expiry Date: 11-08

3-Install clamps as per Dwg D212-664-241. Torque clamps to 80-100 in lb.
assemble as per DEO 212-664 24/-D-1

240	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00							

Quality Control

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W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 69585

Thursday, May 12, 2011 2:21:53 PM

Item ID: D212-664-201 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Aft

Start Date: 5/12/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/2/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250	Pick Kit	0.00				11/31			
Packaging	**Memo**	0.00							
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
QC	**Memo**	0.00 5/16/01							
Quality Control									
270	Packaging	0.00				5/16/01			
Packaging	**Memo**	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-201								

Rev G

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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Thursday, May 12, 2011 2:21:53 PM

Item ID: D212-664-201 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Aft

Start Date: 5/12/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/2/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00						11/6/3	
QC	**Memo**	0.00							
Quality Control									

MF
11-06-02

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

Picklist Print

Thursday, May 12, 2011 2:22:00 PM

Work Order ID: 69585

Parent Item: D212-664-201

Parent Item Name: Crosstube Aft

Start Date: 5/12/2011 **Required Date:** 6/2/2011

Start Qty: 1.00 **Required Qty:** 1.00

Comments: IPP Rev:E□04.02.16□Reformat□K/DS
IPP Rev:F 06-03-29 Remove Coments on Pick List JLM
IPP Rev:G 07-04-30 As per Rev C JLM
IPP Rev:H 08-05-22 up date Qty of rubber cushion DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-201TRNRevC		Manufactured	No	B69587		110	Each	0.0000	1	1		11-5-19	
Crosstube Turning Detail													
D3595-063-530		Manufactured	No			230	Each	48.0000	2	2		11-05-30	
RUBBER CUSHION													
				Location		**Loc Qty**		**Loc Code**					
				LG055		48							
					63407	10							
					67185	38				x4			
D2940-1		Manufactured	No			230	Each	9.0000	2	2		11-05-30	
Support													
				Location		**Loc Qty**		**Loc Code**					
				LG052		9							
					60271	9				x2			
MS21920-28		Purchased	No			230	Each	74.0000	4	4		11-05-30	
Clamp(per MIL-DTL-8783C)													
				Location		**Loc Qty**		**Loc Code**					
				FG		5							
					105884	5							
				LG050		69							
					116839	19							
					117344	50				x4			

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

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NOTE: Date & initial all entries

Picklist Print

Thursday, May 12, 2011 2:22:00 PM

Work Order ID: 69585

Parent Item: D212-664-201

Parent Item Name: Crosstube Aft

Start Date: 5/12/2011 **Required Date:** 6/2/2011

Start Qty: 1.00 **Required Qty:** 1.00

D3428-1 Placard		Manufactured	No		250	Each	25.0000	1	1

Location	Loc Qty	Loc Code
ST053	25	
66961	5	
68920	20	

MS21042L6 Nut		Purchased	No		250	Each	486.0000	6	6

Location	Loc Qty	Loc Code
ST300	486	
117343	286	
117677	200	

AN960JD616 Washer	NAS1149D0663J	Purchased	No		250	Each	0.0000	18	18
AN6-40A Bolt		Purchased	No		250	Each	164.0000	4	4

Location	Loc Qty	Loc Code
ST340	80	
117366	80	
ST343	84	
115905	14	
116549	20	
117688	50	

Dart Aerospace Ltd

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Picklist Print

Thursday, May 12, 2011 2:22:01 PM

Work Order ID: 69585

Parent Item: D212-664-201

Parent Item Name: Crosstube Aft

Start Date: 5/12/2011 **Required Date:** 6/2/2011

Start Qty: 1.00 **Required Qty:** 1.00

AN6-41A	Purchased	No		250	Each	82.0000	2	2

Bolt

11/5/11 SP

Location	Loc Qty	Loc Code	
ST344	82		
115316	17		
117366	50		
117688	15		2

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

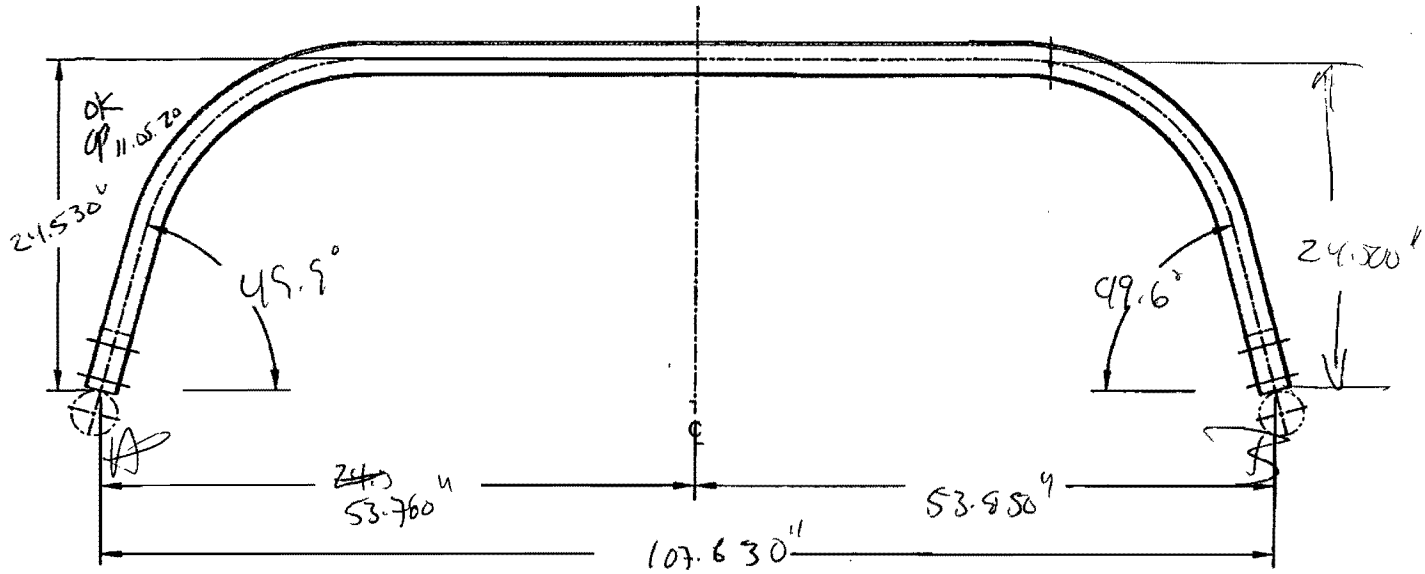
Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	49585
Description: Crosstube High Aft (205/212)	Part Number:	D212-664-201
Inspection Dwg: D212-664-241 **Rev:** D		Page 1 of 1

Required Dimension	Min	Max
Height	24.17	24.43
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments
Tubes are bent high. Acceptable 11.05.20 DSL042

QC15 Inspection	
Date	11/05/20

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. C	KJ/JLM	
C	10.04.01	Dwg Rev updated	KJ	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item	Qty -241	Qty -241B	Part Number	Description
1	X		D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
2		X	D212-664-241B	CROSSTUBE ASSEMBLY (214 HIGH AFT)
3	1	1	D6006-129	CROSSTUBE
4	2	2	D2940-1	SUPPORT
5	4	4	D3595-063-530	RUBBER CUSHION
6	4	4	MS21920-28	CLAMP (OR MS21920-30)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

1) MATERIAL: MANUFACTURED FROM D6006-129
 FINISHED LENGTH = 124.362±0.020
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
4) UNITS: INCHES UNLESS OTHERWISE NOTED.
5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
7) WEIGHT: D212-664-241 = 44.2 lbs (PER IIN-D212-664)
 D212-664-241B = 44.2 lbs (PER IIN-D212-664)
8) PART IS SYMMETRIC ABOUT CENTERLINE.
9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
10) BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
12) INSTALL D2940-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2940-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
13) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE D2940-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 69585
11-05-12

DEO ATTACHED

RELEASED
2009 -10- 29

REV.	DESCRIPTION	BY	DATE
D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -241B (ZN D4-2, B4-2); REMOVED REF & ADD TOLERANCES (ZN D8-3 & C4-3, C6-3 & A8-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -1009 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12

DESIGN	PH	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. REV. D
MFG. APPR.		D212-664-241 SHEET 1 OF 4
APPROVED		TITLE SCALE
DE APPR.		CROSSTUBE ASS'Y (205/212 HI AFT) NTS
DATE 09.09.30		

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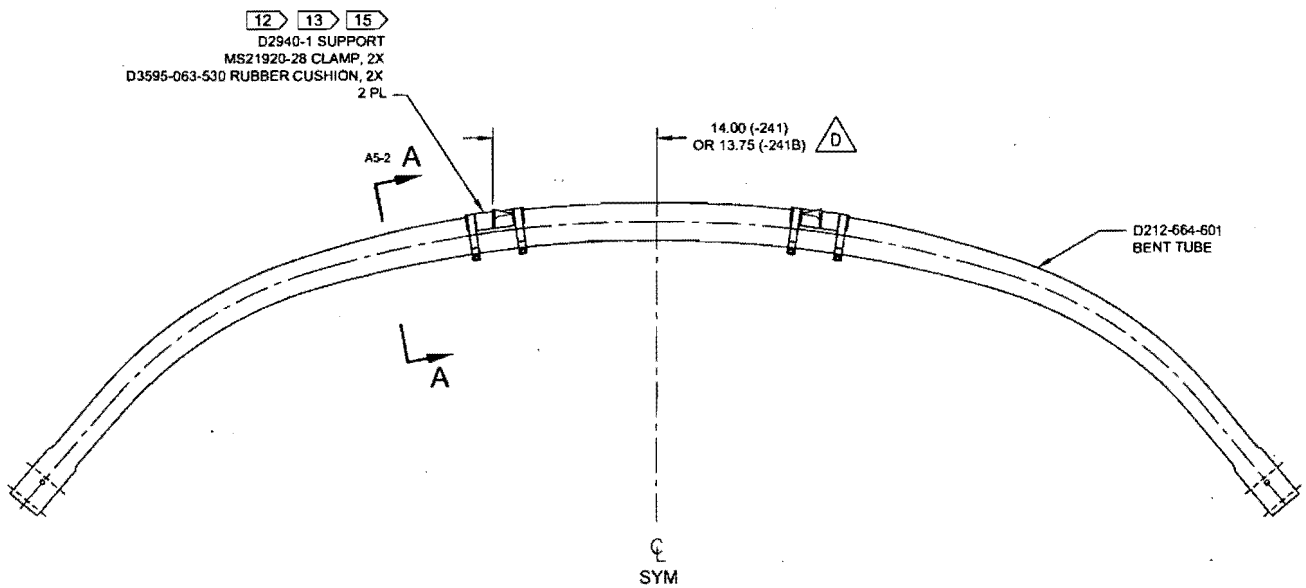
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

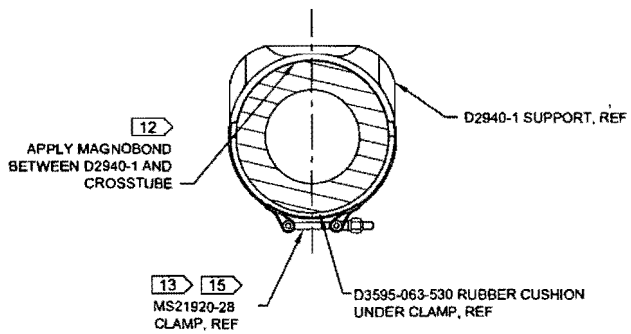
Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries



D212-664-241/-241B
ASSEMBLY DETAIL D



SECTION A-A D6-2
SCALE 4X

w/069585

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DESIGN	PH	**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA
DRAWN	RF	
CHECKED		DRAWING NO. D212-664-241 REV. D
MFG. APPR.		SHEET 2 OF 4
APPROVED		TITLE CROSSTUBE ASS'Y (205/212 HI AFT) SCALE NTS
DE APPR.		
DATE 09.09.30		

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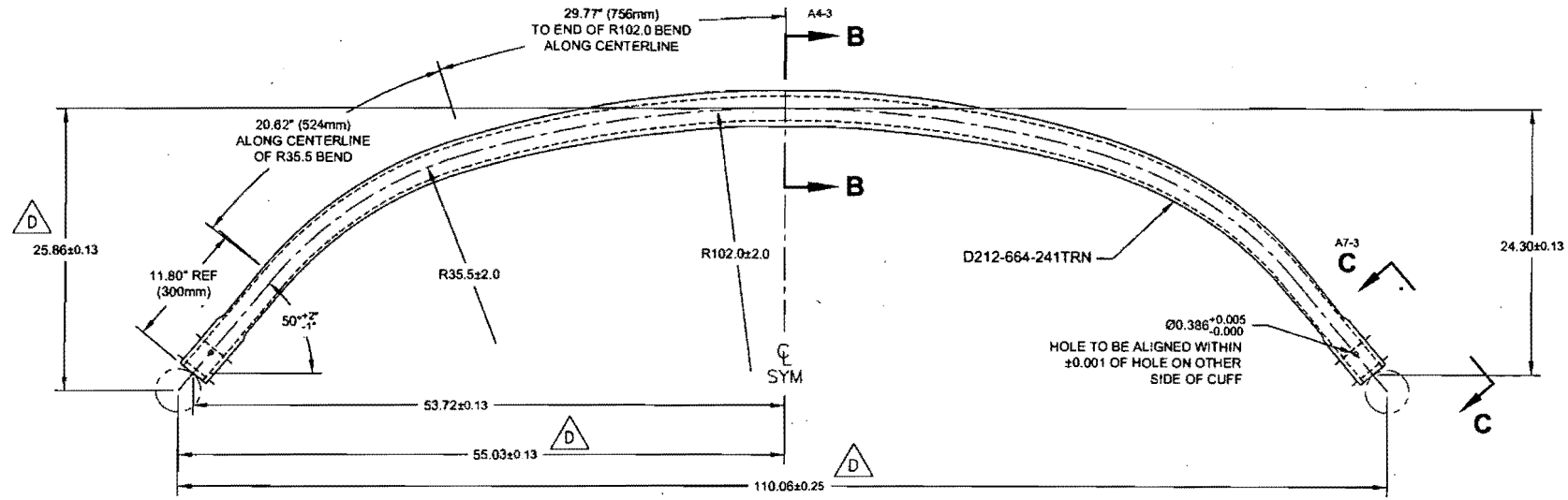
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

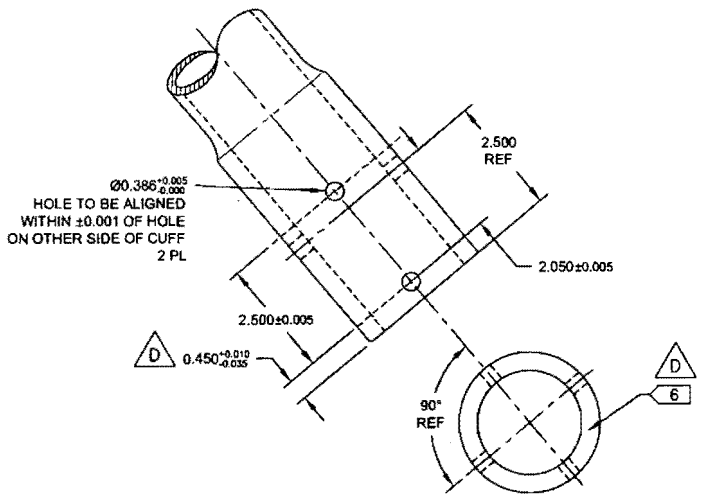
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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

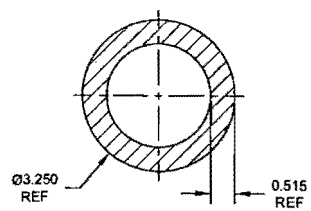
NOTE: Date & initial all entries



D212-664-601 10 D
BENDING AND DRILLING DETAIL



VIEW C-C: CUFF DETAIL D2-3
SCALE 3X



SECTION B-B D4-3
SCALE 4X

w/o 69585

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2009 -10- 29

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. D
MFG. APPR.		D212-664-241	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
DATE	09.09.30		

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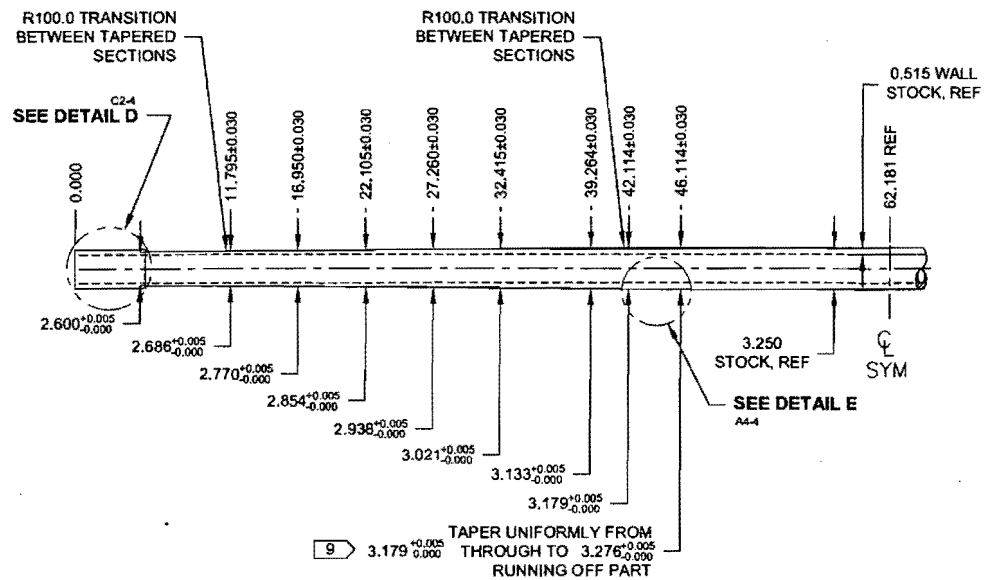
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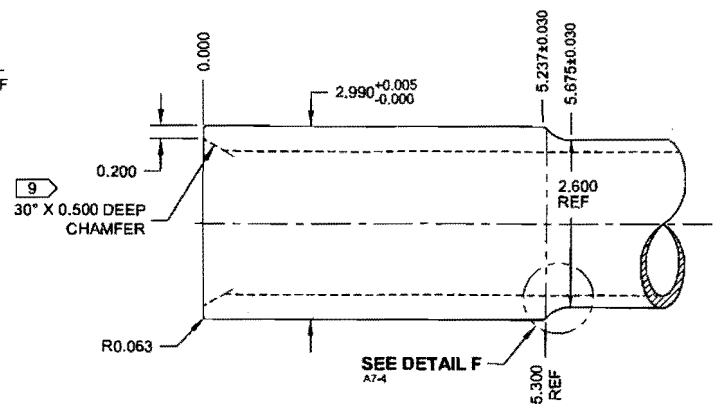
Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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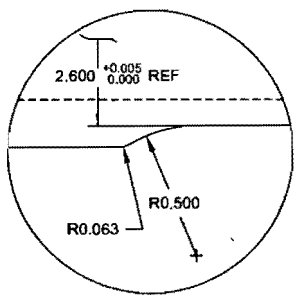
NOTE: Date & initial all entries



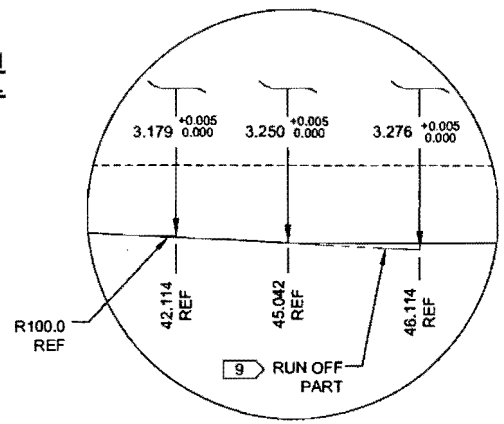


DETAIL D: CROSSTUBE CUFF D8-4
SCALE 5X

D212-664-241TRN TURNING DETAIL



DETAIL F: CUFF TRANSITION C2-4
SCALE 10X



DETAIL E: TAPER RUN-OFF C5-4
NOT TO SCALE

w/o 69585

DEO ATTACHED

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2009 -10- 29

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. D
MFG. APPR.		D212-664-241	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
DATE	09.09.30		

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Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

DRAWING NO.	TITLE	REV. D	DART AEROSPACE LTD.	D.E.O. NO.	SHEET NO.	SCALE
D212-664-241	CROSSTUBE ASSY (205/212 HI AFT)		ENGINEERING ORDER	D212-664-241-D-1	SHEET 1 OF 2	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.04.07	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12

PURPOSE:
ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

RELEASED
2011 -04- 18

CHANGE:

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

IS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
PAINT OUTSIDE PER DART QSI 005 4.2
REMOVE MASKING AND APPLY CLEAR COAT

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

w/o CQ585

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

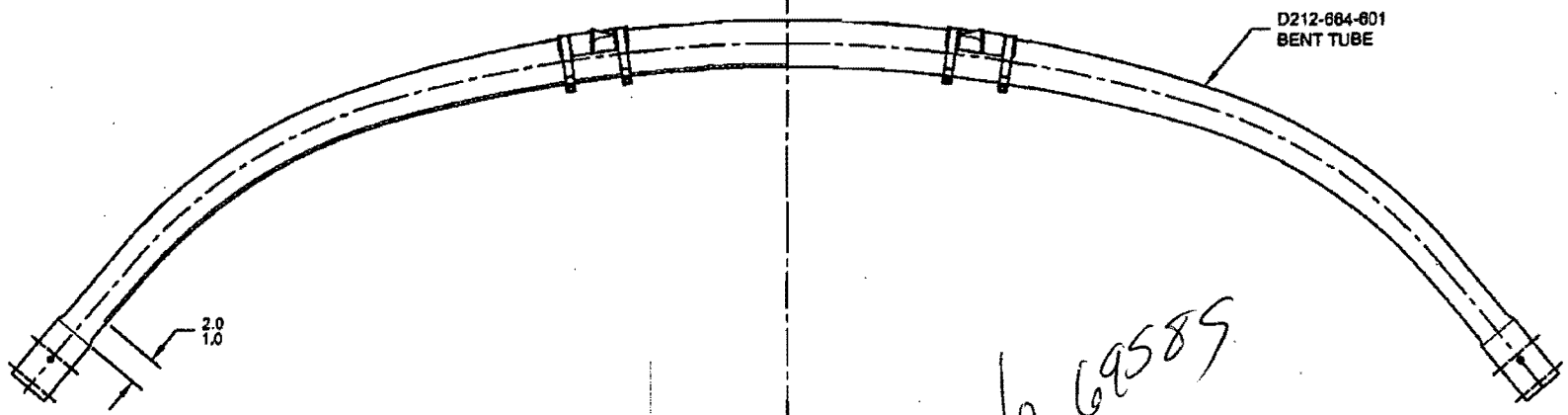
NOTE: Date & initial all entries

DRAWING NO.	TITLE	REV. D	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D212-664-241	CROSSTUBE ASSY (205/212 HI AFT)		ENGINEERING ORDER	D212-664-241-D-1	SHEET 2 OF 2	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.04.07	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12

IS:

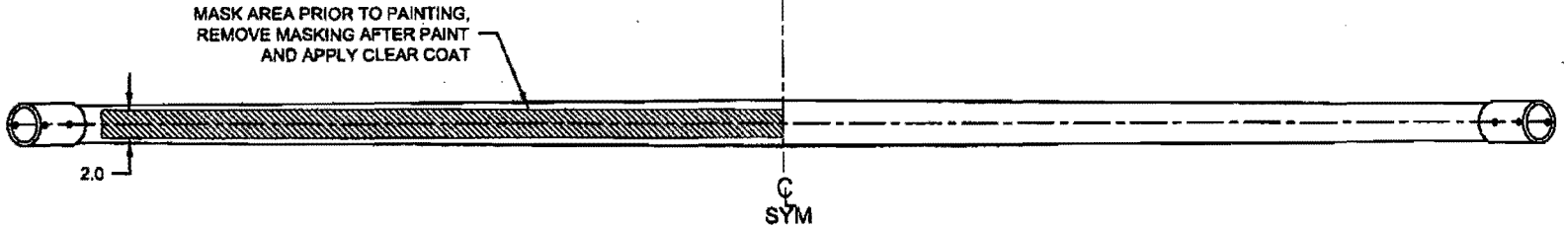
WAS:



w/o 69585

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2011-04-18

D212-664-241/-241B
ASSEMBLY DETAIL



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Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

5.0 PARTS LIST

5.1 HIGH GEAR CROSSTUBES

Item	-101	-201	-203	Part Number	Description
	X			**D212-664-101**	**CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD**
		X		**D212-664-201**	**CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT**
			X	**D412-664-203**	**CROSSTUBE INSTALLATION, 412 HIGH AFT**
1	1			D212-664-141	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
2		1		D212-664-241	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
3			1	D412-664-243	CROSSTUBE ASSEMBLY, 412 HIGH AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-141/-241 OR D412-664-243 ASSEMBLIES ABOVE
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA SKIDTUBES.

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ACUREN

LIQUID PENETRANT TEST REPORT

P- 05611.

PAGE 1 OF 1

CLIENT: DART AEROSPACE | DATE: MAY-26-2011 | TIME: AM ☑ PM ☐

ATTENTION: Lynda Lavallée (CHALLENGE/IAN) | ACUREN JOB NO.: 188-11-02133

ADDRESS: 1270, ABERDEEN RD, HAWKESBURY, ON | PO/WO NO.: 14176

WORK LOCATION: AS ADDRESS

ACCEPTANCE STD.: ASTM 1417/ASME Sec V | REV./DATE: 2005

PROJECT: WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 4 CROSSTUBES

ITEM(S) EXAMINED: - SEE BELOW

JOB DESCRIPTION | PROCEDURE NO. LT-002 REV./DATE 2008 | TECHNIQUE NO. LT-003 REV./DATE 2008

PART NO. | MATERIAL: Aluminum | THICKNESS: N/A

SCOPE: PERFORMED A WET-FLUO L.P. INSPECTION ON 100% OF THE EXTERNAL SURFACE ON CROSSTUBES.

TEST DETAILS

METHOD	☑ FLUORESCENT ☐ VISIBLE			☑ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED	
FAMILY BRAND	MAGNAFLUX			BLACK LIGHT S/N 13798 ☐ OUTPUT > 1000 µW/CM² ☐ AMBIENT < 2 fc	
PENETRANT	ZL-67	MINIMUM DWELL TIME	10 MIN.	LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT>100 fc @ SURFACE	
PENETRANT REMOVER	H2O	MINIMUM DRY TIME	>10 MIN.	OTHER	
DEVELOPER	SKD-S2	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	CAL DUE DATE: Aug/[illegible]/12
DEVELOPER TYPE	☑ NON AQUEOUS ☐ AQUEOUS ☐ DRY				

TEST SURFACE

SURFACE CONDITION	☐ AS GROUND	☐ AS WELDED	☐ MACHINED	☐ SHOT BLASTED	☑ CLEAN BARE METAL
SURFACE TEMPERATURE	☐ < - 4°C/ 20°F	☐ - 4°C/ 20°F TO 10°C/50°F		☑ 10°C/50°F TO 52°C/125°F	☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

			ITEM ID	
1	CROSSTUBE W.O. ID 69643	✓	D407-667-205	AFT
2	W.O. ID 69644	✓	D407-667-205	AFT
3	W.O. ID 69534	✓	D210-664-201	AFT
4	W.O. ID 69535	✓	D210-664-201A	AFT

NO RELEVANT INDICATION WAS DETECTED AS PER APPLICABLE STANDARD

BY 11-05-26

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc's liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE: Ian Titley (PRINT) | (SIGNATURE)

TECHNICIAN (SIGNATURE):

NAME (PRINT): [illegible] (1ST TECHNICIAN) | (2ND TECHNICIAN)

	1ST TECHNICIAN	2ND TECHNICIAN
CGSB LEVEL	2	—
SNT LEVEL	2	—
CGSB REG. NO	3049	

DTR # EW4663

REPORT REVIEWED BY: NAME | INITIALS

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